

1 **1.** A rotary valve comprising:
2 a valve body;
3 a seal structure, carried by said valve body, for forming an elliptical
4 seating surface; and
5 a disc rotatably carried by said valve body and having an elliptical
6 periphery rotatable into and out of sealing engagement with said seating
7 surface.

1 **2.** The rotary valve of Claim 1 wherein said seal structure includes:
2 opposing annular first and second seal cartridge members having a
3 cavity defined therebetween, and
4 an annular seal member received in said cavity and protruding from
5 said cavity for engagement by said elliptical periphery of said disc.

1 **3.** The rotary valve of Claim 2 wherein:
2 said annular seal member is of a resilient material, and
3 said cavity has an elliptical configuration and resiliently deforms said
4 annular seal member to an elliptical shape.

1 **4.** The rotary valve of Claim 3 wherein:
2 said annular seal member has a radially outer peripheral portion
3 clamped between opposing portions of said first and second seal cartridge
4 members.

1 **5.** The rotary valve of Claim 1 wherein:
2 said cavity has an elliptical configuration, and
3 said annular seal member is of a metal material and is resiliently
4 deformable to said elliptical configuration in response to engagement by
5 said elliptical periphery of said disc.

1 **6.** The rotary valve of Claim 1 wherein:
2 said valve body has an interior, and
3 said rotary valve further comprises abutting fixed geometry
4 structures carried by said valve body and said disc and functioning to hold
5 said disc in a precisely centered orientation within said interior of said
6 valve body.

1 **7.** The rotary valve of Claim 6 wherein:
2 said disc is rotatable relative to said valve body about an axis, and
3 said abutting fixed geometry structures include:
4 first and second guide structures spaced apart along said axis,
5 and extending inwardly into said interior of said valve body, and
6 a mounting structure carried by said disc and having
7 oppositely facing surfaces spaced apart along said axis and abutting said
8 first and second guide structures.

1 **8.** The rotary valve of Claim 7 wherein:
2 said valve body has an annular shape with diametrically opposite,
3 parallel flat areas formed on the exterior periphery thereof and spaced
4 apart along said axis, said flat areas having openings extending radially
5 therethrough and removably receiving said first and second guide
6 structures, and

7 said first and second guide structures have enlarged portions
8 abutting said flat areas and preventing further movement of said first and
9 second guide structures into said interior of said valve body.

1 **9.** The rotary valve of Claim 7 further comprising:

2 a shaft rotatably locked to said disc, said shaft having a longitudinal
3 portion rotatably extending through one of said first and second guide
4 structures.

1 **10.** the rotary valve of Claim 7 wherein one of said first and second
2 guide structures has a portion rotatably coupled to said mounting
3 structure.

1 **11.** The rotary valve of Claim 1 further comprising:

2 a shaft having a first longitudinal portion extending inwardly
3 through said valve body and being rotationally locked to said disc, and a
4 second longitudinal portion disposed externally of said valve body and
5 being drivingly rotatable to cause a corresponding rotation of said disc
6 about said axis, and

7 an actuator support structure secured to the exterior of said valve
8 body and being connectable directly to an actuator useable to drivingly
9 rotate said second longitudinal portion of said shaft.

1 **12.** The rotary valve of Claim 11 wherein said actuator support
2 structure is of a one-piece construction and is removably secured to said
3 valve body.

1 **13.** The rotary valve of Claim 12 wherein:

2 said valve body has a generally annular configuration with a
3 circumferentially spaced pair of flat areas formed on the external
4 periphery of said valve body on opposite sides of said second longitudinal
5 portion of said shaft, and

6 said one-piece actuator support structure has a generally inverted U-
7 shaped configuration with a spaced pair of leg portions with free end
8 portions removably secured to said flat areas of said valve body, and a
9 closed outer end portion to which a valve actuator may be directly
10 secured.

1 **14.** A rotary valve comprising:

2 a valve body having an interior;
3 a seal structure carried by said valve body and defining a seating
4 surface;

5 a disc carried within said valve body interior for rotation relative to
6 said valve body about an axis and having a periphery rotatable into and
7 out of sealing engagement with said seating surface; and

8 abutting fixed geometry structures carried by said valve body and
9 said disc and functioning to hold said disc in a precisely centered
10 orientation within said interior of said valve body.

1 **15.** The rotary valve of Claim 14 wherein said abutting fixed
2 geometry structures include:

3 first and second guide structures spaced apart along said axis and
4 extending inwardly into said interior of said valve body, and

5 a mounting structure carried by said disc and having oppositely
6 facing surfaces spaced apart along said axis and abutting said first and
7 second guide structures.

1 **16.** The rotary valve of Claim 15 wherein:

2 said valve body has an annular shape with diametrically opposite,
3 parallel flat areas formed on the exterior periphery thereof and spaced
4 apart along said axis, said flat areas having openings extending radially
5 therethrough and removably receiving said first and second guide
6 structures, and

7 said first and second guide structures have enlarged portions
8 abutting said flat areas and preventing further movement of said first and
9 second guide structures into said interior of said valve body.

1 **17.** The rotary valve of Claim 15 further comprising:

2 a shaft rotatably locked to said disc, said shaft having a longitudinal
3 portion rotatably extending through one of said first and second guide
4 structures.

1 **18.** The rotary valve of Claim 15 wherein one of said first and second
2 guide structures has a portion rotatably coupled to said mounting
3 structure.

1 **19.** A rotary valve comprising:
2 a valve body;
3 a seal structure carried by said valve body and defining a seating
4 surface;
5 a disc rotatably carried by said valve body and having a periphery
6 rotatable into and out of sealing engagement with said seating surface;
7 a shaft having a first longitudinal portion rotationally locked to said
8 disc, and a second longitudinal portion disposed externally of said valve
9 body and being drivingly rotatable to cause a corresponding rotation of
10 said disc; and
11 an actuator support structure secured to the exterior of said valve
12 body and being connectable directly to an actuator useable to drivingly
13 rotate said second longitudinal portion of said shaft.

1 **20.** The rotary valve of Claim 19 wherein said actuator support
2 structure is of a one-piece construction.

1 **21.** The rotary valve of Claim 19 wherein said actuator support
2 structure is removably secured to said valve body.

1 **22.** The rotary valve of Claim 21 wherein:
2 said valve body has a generally annular configuration with a
3 circumferentially spaced pair of flat areas formed on the external
4 periphery of said valve body on opposite sides of said second longitudinal
5 portion of said shaft, and
6 said one-piece actuator support structure has a generally inverted U-
7 shaped configuration with a spaced pair of leg portions with free end
8 portions removably secured to said flat areas of said valve body, and a

9 closed outer end portion to which a valve actuator may be directly
10 secured.

1 **23.** A method of constructing a seal cartridge for a rotary valve, said
2 method comprising the steps of:

3 providing a first seal cartridge member having a side transverse to
4 and circumscribing a first axis;

5 exerting and maintaining on said first seal cartridge member
6 oppositely directed forces resiliently deforming it along a second axis
7 transverse to said first axis;

8 forming on said side of the resiliently deformed first seal cartridge
9 member a circularly configured depression circumscribing said first axis;

10 terminating said forces to permit the resiliently deformed first seal
11 cartridge member to return to its original shape and thereby cause said
12 circularly configured depression to assume an elliptical shape; and

13 inserting an annular seal member in the elliptically shaped
14 depression.

1 **24.** A seal cartridge constructed by the method of Claim 23.

1 **25.** The method of Claim 23 further comprising the steps of:

2 providing a second seal cartridge member, and

3 sandwiching said seal member between said first and second seal
4 cartridge members.

1 **26.** A seal cartridge constructed by the method of Claim 25.

1 **27.** The method of Claim 23 wherein:
2 said annular seal member has a circular shape, and
3 said inserting step is performed in a manner causing the seal
4 member to be deformed to an elliptical shape within said depression.

1 **28.** A seal cartridge constructed by the method of Claim 27.

1 **29.** The method of Claim 27 wherein said step of inserting an
2 annular seal member is performed using an annular seal member having
3 an elastomeric body portion.

1 **30.** A seal cartridge constructed by the method of Claim 29.

1 **31.** The method of Claim 23 wherein said step of inserting an
2 annular seal member is performed using an annular metal seal member.

1 **32.** A seal cartridge constructed by the method of Claim 31.